

## Coursework Assignment Brief

Academic Year 2025-26 S1

<b>Module Title:</b> Artificial Intelligence and Machine Learning			
<b>Module Code:</b> CMP6202			
<b>Assessment Type</b> Coursework	<b>Level</b> 6	<b>Weighting</b> 100%	<b>Word Count</b> Report: 3,000 words (excluding references), reproducible codebase
<b>Submission Date</b>  Coursework: 05 <sup>th</sup> December 2025	<b>Submission Time</b> 03:00 PM	<b>Module Leader</b> Nouh Elmitwally	

### Assessment Brief

Assessment Information	
Assessment Summary	<p>D1 [Individual]: Quiz (20%),</p> <ol style="list-style-type: none"><li><u>Format</u>: Multiple Choice Questions (MCQ)</li><li><u>Duration</u>: 90 minutes (120 minutes for students with a support statement)</li><li><u>Schedule</u>: Week commencing 27<sup>th</sup> October (available throughout the week)</li></ol> <p>D2 [Individual]: coursework (80%), Includes final report (3000 words) and well-documented, reproducible codebase</p>
Assessment Title	Artificial Intelligence using Machine Learning Models
Things to include:	<p>At the high level your report should include the following sections. More detailed guidance is provided in the full description below:</p> <p>Report Introduction Exploratory Data Analysis (EDA) Predictive Modelling / Model Development Evaluation and Further Modelling Improvements Conclusion References</p>

Completion of this assessment will address the following learning outcomes:

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1	Compare the different aspects involved in the modern Artificial Intelligence, Machine Learning and Data Science.
2	Critically evaluate and practice a range of Machine Learning algorithms, Data Science tools, and frameworks for developing AI solutions.
3	Apply the learned algorithms, tools and frameworks to solve real life problems.
4	Demonstrate skills in formulating research problems and writing technical reports.

### **Submission Information**

Present any written aspects of the assessment using font size 11 and using 1.5 spacing to allow for comments and annotations to be added by the markers.

Complete the appropriate cover sheet for this assessment and append your work.

This assessment will be marked anonymously and should show your student number only.

Submit this coursework assessment task via Moodle.

### **Late Submission**

Assessments must be submitted in the format specified in the assessment task, by the deadline and to the submission point published on Moodle. Failure to submit by the published deadline will result in penalties which are set out in Section 6 of the Academic Regulations, available at:

<https://icity.bcu.ac.uk/Quality-Enhancement-and-Inclusion/Quality-Assurance-and-Enhancement/Academic-Regulations>

### **Word Count**

The maximum word count for this module assessment is shown on Page 1. A +10% margin of tolerance is applied, beyond which nothing further will be marked. Marks cannot be awarded for any learning outcomes addressed outside the word count.

The word count refers to everything in the main body of the text (including headings, tables, citations, quotes, lists etc.). Everything before (i.e. abstract, acknowledgements, contents, executive summaries etc.) and after (i.e. references, bibliographies, appendices etc) is **not** included in the word count limit.

### **Referencing Style**

BCU Harvard

### **Use of Artificial Intelligence**

Whilst AI tools can be helpful in assisting learning, when it comes to assessment, the [Academic Misconduct Procedure](#) is clear that this should be a student's own original work and not the work of other people or AI tools.

The [Use of AI Tools – Student Guidelines](#) follows the same guidelines your lecturers use. If you are unsure of whether AI is appropriate within your work, please read the guidelines or ask your lecturer. For advice and guidance around academic writing, please visit the [Centre for Academic Success](#).

**PERMITTED (neither prohibited or required) If you use generative Artificial Intelligence (AI) in the process of completing this assessment you MUST set out clearly the following:**

1. WHY you used generative AI
2. WHAT it was used for
3. WHICH AI was used; and
4. If any generated content has been used directly in this submission, if so where. Note that this declaration does NOT contribute towards the word count for the assessment. You will also have to confirm in your declaration that the work remains yours and you have intellectual ownership of it. You may be invited for an informal conversation to discuss the approach to your assessment. A failure to disclose the use of AI, or the use of a misleading description of its use will be considered academic misconduct. As a result, keeping good records of your interactions is strongly advised.

### **Academic Integrity Guidance**

Academic Integrity means completing and submitting your own original work while properly acknowledging sources. Following academic conventions, such as referencing and citation, helps avoid plagiarism. The [Centre for Academic Success](#) offers resources on Moodle, workshops and 1-2-1 support to improve skills like paraphrasing and referencing.

It is important to recognise that seeking out learning around academic integrity will help reduce the risk of misconduct in your work. Skills such as paraphrasing, referencing and citation are integral to acting with integrity and you can develop and advance these key academic skills through the

<https://www.bcu.ac.uk/cas>

To learn more about academic integrity and its importance at university, you can access CAS resources on Moodle. Furthermore, you can book on to workshops and request 1-2-1 support around key academic skills.

### **Academic Misconduct**

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**COURSEWORK ASSIGNMENT BRIEF**

***CMP6202 – Artificial Intelligence and Machine Learning***

Academic misconduct is conduct that has or may have the effect of providing you with an unfair advantage by relying on dishonest means to gain advantage and which therefore compromises your academic integrity.

The Academic Misconduct procedure sets out the process we will follow, and the penalties we may apply, in cases where we believe you may have compromised your academic integrity by committing academic misconduct. The Academic Misconduct Procedure and information about academic support is available at:

<https://icity.bcu.ac.uk/Student-Affairs/Appeals-and-Resolutions/Academic-Misconduct-Procedure>

**Title:** Build and evaluate a machine learning model to solve a real-life problem (e.g., an industrial challenge) using an appropriate dataset.

**Style:** Coursework consisting of a report, dataset, and programming scripts / notebooks.

**Rationale:** This coursework is most suited for assessing the learning outcomes of the module providing the practical nature of the AI field. The area is growing fast and the interest in machine learning solutions constantly increases. Learning to formulate and solving practical and research-oriented data-driven projects will ensure your continuing employability through development of analytical soft skills.

**Description:**

You are required to find a publicly available dataset, formulate a **classification** or **regression** problem to address with the dataset (e.g., predict whether a mushroom is poisonous or not based on its characteristics), identify an appropriate set of algorithms that can be used to attempt to solve the classification or regression task.

Build and evaluate a machine learning model that would address the problem, and draw conclusions and recommendations based on your findings. The submission should include your report, dataset (plus any number of sets representing pre-processing stages if needed) and Python scripts with comments, all included in one zip-file. Your work should be original and produced by you. Copying whole tutorials, scripts or images from other sources is not allowed. Any material you borrow from other sources to build on should be clearly referenced (use comments to reference in Python scripts); otherwise, it will be treated as plagiarism, which may lead to investigation and subsequent action.

You can use any open data, from online sources e.g.:

- <https://archive.ics.uci.edu/ml/datasets.php>
- <https://www.kaggle.com/datasets>
- <https://data.gov.uk/>

[Providing that said data can be freely used based on its usage agreement / license](#)

**Additional information:**

**D1 [Individual]: Quiz (20%)**

1. Format: Multiple Choice Questions (MCQ)
2. Duration: 90 minutes (120 minutes for students with a support statement)
3. Schedule: Week commencing 27<sup>th</sup> October (available throughout the week)

**D2 [Individual]: Coursework (80%)**

Ensure your report is well-organized, clearly written, and includes appropriate tables, charts, and figures to support your analysis. Be prepared to discuss your findings and the implications of your work in the context of machine learning.

## **Report Introduction**

### **1.1 Dataset Exploration & Research Questions**

- Clearly identify and describe the dataset used in your project. Provide details on its source, relevance, and any pertinent background information.
- Students work on an open-source dataset (from sources like Kaggle, UCI, etc.).
- Formulate 2–3 meaningful research questions or hypotheses on the dataset.
- Justify dataset choice (relevance, size, features, etc.).
- Discuss potential challenges (missing data, imbalance, etc.).

### **1.2 Supervised Learning Task Identification**

- Define the supervised learning task you are addressing (e.g., classification, regression). Explain the problem context and its significance.

## **Exploratory Data Analysis (EDA)**

### **2.1 Question(s) Identification**

- Formulate specific questions or hypotheses that your EDA aims to answer.

### **2.2 Splitting the Dataset**

- Describe how you split the dataset into training and testing sets. Include the rationale for your chosen method (e.g., stratified sampling).

### **2.3 Exploratory Data Analysis Process and Results**

- Conduct a thorough EDA, presenting key findings using visualizations and statistical summaries. Discuss patterns, trends, and anomalies.
- Data cleaning (handling missing values, outliers)
- Feature understanding (distributions, correlations, etc.)
- Visualizations (histograms, box plots, pair plots, etc.)
- Feature engineering (if applicable)

## **3. Predictive Modelling / Model Development**

### **3.1 Identification of Your Chosen Supervised Learning Algorithm(s)**

- Detail the machine learning algorithms you have selected for your project. Justify your choices based on the problem context and EDA findings.

### **3.2 Identification of Appropriate Evaluation Techniques**

- Explain the evaluation metrics and techniques you will use to assess model performance (e.g., accuracy, precision, recall, F1-score, MAE, MSE, MAPE, RMSE etc.).

### **3.3 Hyperparameter tuning and cross-validation.**

### **3.4 Limitations and Options**

- Discuss any limitations of your dataset and methodology.
- Explore alternative approaches and potential improvements.

## **4. Evaluation and Further Modelling Improvements**

- Evaluate the performance of your models on the test data.
- Discuss any issues identified and propose further improvements, such as hyperparameter tuning, feature engineering, or using advanced algorithms.

## **5. Conclusion**

### **5.1 Summary of Results**

- Summarize the key results of your project, emphasizing the effectiveness of your models and any significant findings.

### **5.2 Reflection on Individual Learning**

- Reflect on your learning experience throughout the project.
- Discuss the challenges faced, skills acquired, and insights gained.

## **6. References**

- Include a comprehensive list of all references cited in your report.
- Follow a consistent citation style as per your academic guidelines.

### **Deliverables:**

- Annotated Jupyter notebook(s) or Python scripts
- Optional: GitHub repo or ZIP file submission for reproducibility

### **Note on References:**

- Include a comprehensive list of all references cited in your report.
- Follow a consistent citation style as per your academic guidelines.
- Include references to any coding tutorial that have been used in the experiments.

**Note on Dataset:**

Before using any open-source dataset, ensure you review its licensing terms and publishing rights to confirm that it permits academic use, redistribution, and modification—respecting data ownership and ethical guidelines is essential in responsible AI research.

**Submission Details:**

**Format:** Upload assessments to Moodle within the relevant upload points

**Regulations:**

- The minimum pass mark for a module is 40%
- Re-sit marks are capped at 40%

**Late Penalties:**

If you submit an assessment late at the first attempt, then you will be subject to one of the following penalties:

- if the submission is made **between 1 and 24 hours** after the published deadline the original mark awarded will be reduced **by 5%**. For example, a mark of 60% will be reduced by 3% so that the mark that the student will receive is 57%.
- if the submission is made between **24 hours and one week (5 working days)** after the published deadline the original mark awarded will be reduced by 10%. For example, a mark of 60% will be reduced by 6% so that the mark the student will receive is 54%.

**if the submission is made after 5 days following the deadline, your work will be deemed as a fail and returned to you unmarked.**

The reduction in the mark will not be applied in the following two cases:

- the mark is below the pass mark for the assessment. In this case the mark achieved by the student will stand
- where a deduction will reduce the mark from a pass to a fail. In this case the mark awarded will be the threshold (i.e., 40%)

**Please note:**

**If you submit a re-assessment late then it will be deemed as a fail and returned to you unmarked.**

**Feedback:**

Marks and Feedback on your work will normally be provided within 20 working days of its submission deadline.



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**CMP6202 – Artificial Intelligence and Machine Learning**  
**D2 [Individual]: Coursework -- Table of Marking Criteria (80%)**

Criterion	0-20% Fail	20-39% Fail	40-49%	50-59%	60-69%	70-79%	80-100%
<b>Dataset(s) &amp; Question(s)</b>  (18.75 % of overall module mark)	Inappropriate dataset or lack of its initial analysis and understanding; ill-formulated questions.	Appropriate dataset, but its initial analysis is poor, and/or oversimplified questions.	Satisfactory dataset and questions, but significant errors in initial dataset analysis or not fully justified questions.	Satisfactory dataset and justified questions, but some minor errors in initial analysis.	Good choice of dataset and questions with fair impact and no errors in initial analysis.	Very good choice of dataset and questions with significant impact, no errors in initial analysis.	Excellent choice of dataset and questions with major impact, no errors in initial analysis.
<b>Modelling</b> (37.5% of overall module mark)	Missing or inappropriate data pre-processing, feature selection, modelling and/or results interpretation.	Incomplete or significant errors in data pre-processing, modelling and/or results interpretation.	Satisfactory data pre-processing, feature selection, modelling and results interpretation, but with some major errors or missing details.	Good data pre-processing, feature selection, modelling and results interpretation, but with some minor errors or missing details.	Good data pre-processing, feature selection, modelling and results interpretation, with no errors.	Very strong case of pre-processing, feature selection, modelling and results interpretation, with attention to details and no errors.	Excellent pre-processing, feature selection, modelling and results interpretation, error free with some advanced techniques employed and several settings tested.
<b>Code</b> (25% of overall module mark)	Missing or not compiling/executing.	Compiling and executing but implementing only some deliverables.	All deliverables are implemented, but there are some major errors, s/w principles are not followed, and/or lack of comments.	All deliverables are implemented, but there are some minor errors, not all s/w principles are not followed, and/or insufficient/inaccurate comments.	All deliverables are implemented with no errors, but code is not optimised and/or with insufficient comments.	All deliverables are implemented in efficient way, following s/w principles, with clear and accurate comments, and no errors.	All deliverables are implemented in efficient way, following s/w principles, employing some advanced methods, with clear and accurate comments, and no errors.

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**COURSEWORK ASSIGNMENT BRIEF**

***CMP6202 – Artificial Intelligence and Machine Learning***

<b>Report (18.75% of overall module mark)</b>	Not appropriatel y structured with main sections missing.	Badly planned and/or some sections and/or referencin g to code missing.	All required sections are covered, but structure is not well planned or major details missing.	Well planned with all required sections present, but some details or code referencin g missing or not clearly explained.	Well planned and clearly formulated with all required sections present, but with some minor details missing.	Very well planned and clearly presented, with appropriat e and sufficient referencin g to code and literature.	Excellent, complete, clearly presented profession al work, with appropriat e and sufficient referencin g to code and literature.
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